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SRI VASAVI ENGINEERING COLLEGE (AUTONOMOUS)

(Sponsored by Sri Vasavi Educational Society)
(Approved by AICTE, New Delhi & Permanently affiliated to JNTUK, Kakinada)
(Accredited by NAAC with 'A' Grade ,Recognized by UGC under section 2(f) & 12(B))
(**NBA** Accreditation to B.Tech., EEE,CSE, ME and ECE Branches for 3 Years)
Pedatadepalli, **TADEPALLIGUDEM – 534 101.** W.G.Dist. **(A.P)**

M. Tech - Power Electronics & Power Systems (PE&PS) under V21 Regulation

M. Tech - I Semester							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Marks**
1.	V21PET01	Analysis of Power Electronic Converters	3	0	0	3	100
2.	V21PET02	Power System Operation & Control	3	0	0	3	100
3.	V21PET03 V21PET04 V21PET05	Elective – I: 1. Control & Integration of Renewable Energy systems 2. Smart Grid 3. Power Quality	3	0	0	3	100
4.	V21PET06 V21PET07 V21PET08	Elective – II: 1. Electrical Distribution Automation 2. HVDC Transmission 3. Advanced Power System Protection	3	0	0	3	100
5.	V21MBT55	Research Methodology and IPR	2	0	0	2	100
6.	V21PEL01	Power Electronics Simulation Lab	0	0	4	2	100
7.	V21PEL02	Power Systems Lab	0	0	4	2	100
8.		Audit Course – I	2	0	0	0	100
			16	0	8	18	800

M. Tech – II Semester							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Marks**
1.	V21PET09	Switched Mode Power Conversion	3	0	0	3	100
2.	V21PET10	Real Time Control of Power Systems	3	0	0	3	100
3.	V21PET11 V21PET12 V21PET13	Elective – III: 1. Electrical Machine Modeling & Analysis 2. Control of Electric Drives 3. Application of Power Converters	3	0	0	3	100
4.	V21PET14 V21PET15 V21PET16	Elective – IV: 1. EHVAC Transmission 2. Flexible AC Transmission Systems 3. Power System Dynamics & Stability	3	0	0	3	100
5.	V21PEP01	Mini Project with Seminar	0	0	4	2	100
6.	V21PEL03	Power Converters Lab	0	0	4	2	100
7.	V21PEL04	Power Systems Simulation Lab	0	0	4	2	100
8.		Audit Course – II	2	0	0	0	100
			14	0	12	18	800

Audit course 1 & 2

1. English for Research Paper Writing
2. Disaster Management
3. Value Education
4. Constitution of India
5. Pedagogy Studies
6. Stress Management by Yoga
7. Personality Development through Life Enlightenment Skills.

M. Tech – III Semester							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Marks**
1.	V21PET17 V21PET18 V21PET19	Elective – V: 1. Hybrid Electric Vehicles 2. Soft Computing Techniques in Electrical Engineering 3. MOOCS-1 through NPTEL/ SWAYAM- 12 Week Program related to the programme which is not listed in the course structure	3	0	0	3	100
2.	V21OET01 V21MBT56 V21OET03	Open Elective : 1. Operations Research 2. Cost Management of Engineering Projects 3. MOOCs-2 Through NPTEL /SWAYAM - Any 12 week course on Engineering/ Management/ Mathematics offered by other than parent department	3	0	0	3	100
3.	V21PEP02	Dissertation Phase - I	0	0	20	10	50
			6	0	20	16	250

M. Tech – IV Semester							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**	**Marks**
1.	V21PEP03	Dissertation Phase – II	0	0	32	16	100
			0	0	32	16	100

Course Outcomes

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET01
Name of the Course	Analysis of Power Electronic Converters					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Explain the Static and Dynamic Characteristics of power switching devices.	K2
CO2	Analyze the parameters of AC-DC converters	K4
CO3	Explain the operation of power factor correction converters	K2
CO4	Analyze the operation of three phase inverters with PWM control.	K4
CO5	Understand the principles of operation of multi- level inverters and their applications	K2

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET02
Name of the Course	Power System Operation & Control					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Apply various load flow methods to analyse the system	K3
CO2	Apply various methods to solve unit commitment problem and understand Optimal power flow	K3
CO3	Determine the transfer function of single area load frequency control	K3
CO4	Calculate the frequency deviation for two area load frequency control	K3
CO5	Explain the effect of generation with limited energy supply.	K2

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET03
Name of the Course	Control & Integration of Renewable Energy Systems (Elective -I)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the fundamental requirements of Grid Integration	K2
CO2	Explain different conventional & non-conventional dynamic energy conversion technologies	K2
CO3	Describe different renewable energy sources and storage devices	K2
CO4	Understand the real & reactive power control techniques with renewable generators	K2
CO5	Develop a model of complete system for standalone/grid connected system	K4

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET04
Name of the Course	Smart Grid (Elective-I)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand concept of smart grid and its advantages over conventional grid.	K2
CO2	Understand smart metering techniques and measuring techniques	K2
CO3	Understand monitoring, protection techniques and storage systems for smart grids	K2
CO4	Illustrate the concept of Micro Grid and its integration	K2
CO5	Examine different communication technologies that can be used for smart grid	K2

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET05
Name of the Course	Power Quality (Elective-I)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Identify the issues related to power quality in power systems	K2
CO2	Describe the problems of transient and long duration voltage variations in power systems	K2
CO3	Analyze the effects of harmonics and understand different mitigation techniques.	K4
CO4	Identify the importance of custom power devices and their applications	K2
CO5	Choose suitable custom power device to mitigate power quality problem	K2

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET06
Name of the Course	Electrical Distribution Automation (Elective-II)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand various factors of distribution system	K2
CO2	Construct the distribution substation and feeders	K3
CO3	Understand the distribution system protection and its coordination.	K2
CO4	Understand the effect of compensation for power factor improvement.	K2
CO5	Explain the distribution automation functions	K2

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET07
Name of the Course	HVDC Transmission (Elective-II)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the various schemes of HVDC transmission	K2
CO2	Explain the operation of static power converters for HVDC transmission	K2
CO3	Describe various control techniques of power converters	K2
CO4	Understand the interaction between HVAC and HVDC system.	K2
CO5	Understand the various protection schemes of HVDC transmission	K2

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET08
Name of the Course	Advanced Power Systems Protection (Elective-II)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Classify different types of static relays and tools.	K2
CO2	Explain various Amplitude and Phase Comparators	K2
CO3	Describe different types of static over current relays.	K2
CO4	Understand the PILOT Relaying schemes	K2
CO5	Identify suitable Microprocessor based and Numerical relays for power system protection	K2

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	0	0	4	2	V21PEL01
Name of the Course	Power Electronics Simulation Laboratory					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Analyze the DC-DC converters using small signal model	K4
CO2	Analyze the operation of Multi-level inverters	K4
CO3	Analyze the different PWM techniques for inverters	K4
CO4	Analyze the operation of AC Voltage regulators	K4
CO5	Analyze the operation of AC-DC converters	K4

Semester	I SEM	L	T	P	C	COURSE CODE
Regulation	V21	0	0	4	2	V21PEL02
Name of the Course	Power Systems Laboratory					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Calculate the sequence impedances of 3 phase Transformer and Alternator	K3
CO2	Determine the power Angle Characteristics of 3-phase Alternator with infinite bus bars	K4
CO3	Estimate the performance of long transmission lines	K4
CO4	Determine the ABCD parameters of a transmission line model	K4
CO5	Analyse the Ferranti effect in long transmission line	K4

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET09
Name of the Course	Switched Mode Power Conversion					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Explain operation and control of non-isolated switch mode converters.	K2
CO2	Describe operation and control of isolated switch mode converters.	K2
CO3	Understand the operation and control of resonant converters	K2
CO4	Compute control strategies of switching converters	K3
CO5	Explain the operation of switch mode converters based on linearization and small-signal analysis.	K3

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET10
Name of the Course	Real Time Control of Power Systems					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Classify the state estimation methods and understand the concepts of bad data observability, detection, identification and elimination	K2
CO2	Identify and Recognize the security, contingency and line outages in power system	K2
CO3	Illustrate the need of computer control and SCADA in real time power system	K2
CO4	Understand the concept of voltage stability in real time power systems	K2
CO5	Understand the basic concepts of Synchrophasor Measurement units	K2

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET11
Name of the Course	Electrical Machine Modeling and Analysis (Elective –III)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Analyze Kroon's Primitive Machine	K2
CO2	Develop modeling of dc machine	K3
CO3	Explain linear Transformation	K4
CO4	Apply mathematical modeling concepts to 3-phase Induction machines	K3
CO5	Design control strategies based on dynamic modeling of 3-ph Induction machines and3-phase Synchronous machine	K4

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET12
Name of the Course	Control of Electric Drives (Elective –III)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand fundamentals of electric drives	K2
CO2	Understand various DC motor drives and control	K2
CO3	Analyze control techniques of synchronous motor drives	K4
CO4	Analyze control techniques for Switched Reluctance Motor	K4
CO5	Understand operation and various control schemes of BLDC motor	K2

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET13
Name of the Course	Applications of Power Converters (Elective –III)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	understand the inverters for induction heating applications	K2
CO2	understand the power converters for different industrial applications	K2
CO3	understand modeling of high voltage power supplies using the power converters for radar and space applications	K2
CO4	understand modeling of low voltage and high current power supplies using the power converters for microprocessors and computer loads	K2
CO5	understand the applications of DC-DC converters	K2

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET14
Name of the Course	EHVAC Transmission (Elective –IV)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Determine the transmission line parameters	K3
CO2	Calculate the field effects on EHV and UHV AC lines.	K3
CO3	Determine the corona, RI and audible noise in EHV and UHV lines	K3
CO4	Analyze voltage control and compensation problems in EHV and UHV transmission systems	K4
CO5	Understand reactive power compensation using SVC and TCR	K2

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET15
Name of the Course	Flexible AC Transmission System (Elective –IV)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Explain the improvements of transmission system with FACTS	K2
CO2	Illustrate different Types of Static VAr generation systems	K3
CO3	Estimate the effect of static shunt compensation.	K2
CO4	Estimate the effect of static series compensation.	K2
CO5	Explain the principle of operation and various controls of UPFC	K2

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET16
Name of the Course	Power System Dynamics and Stability (Elective –IV)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Develop the State space Model of Synchronous Machine	K3
CO2	Analyse the Steady State Stability and Dynamic Stability of Synchronous machine	K4
CO3	Solve the Swing Equation using different methods to obtain the Transient Stability	K3
CO4	Illustrate the Effect of Governing and Excitation systems on Stability	K3
CO5	Discuss Different types of Excitation Systems	K2

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	0	0	4	2	V21PEL03
Name of the Course	Power Converters Laboratory					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Find the duty ratio of DC-DC Converters	K3
CO2	Analyze the performance of 1- ϕ AC-DC Controlled rectifiers	K4
CO3	Sketch the characteristics of power semiconductor devices	K3
CO4	Find the modulation index of square wave &SPWM inverters	K3
CO5	Calculate input power factor of 3-ϕ full converter	K3

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	0	0	4	2	V21PEL04
Name of the Course	Power Systems Simulation Laboratory					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Analyze the performance of the various transmission lines at different loading conditions	K4
CO2	Examine the load flow study on distribution systems	K4
CO3	Inspect the Z- and Y-bus matrices for the given power transmission system	K4
CO4	Determine the load flow solution obtained using GS and NR methods	K4
CO5	Analyze the transient stability & load frequency control problem of a power system	K4

Semester	II SEM	L	T	P	C	COURSE CODE
Regulation	V21	0	0	4	2	V21PEP01
Name of the Course	Mini Project with Seminar					
Specialization	Power Electronics & Power systems					

Semester	III SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET17
Name of the Course	Hybrid Electric Vehicles (Elective–V)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Explain various configurations and basics of HEVs	K2
CO2	Distinguish the concepts and components of various hybrid technologies	K2
CO3	Review the architectures, range extension mechanisms and grid support of PHEVs	K2
CO4	Discuss the PE converters for battery charging and speed control of HEVs	K2
CO5	Illustrate various Energy Storage Technologies	K2

Semester	III SEM	L	T	P	C	COURSE CODE
Regulation	V21	3	0	0	3	V21PET18
Name of the Course	Soft Computing Techniques in Electrical Engineering (Elective–V)					
Specialization	Power Electronics & Power systems					

Course Outcomes:

After successful completion of this course, the students will be able to

CO No.	Course Outcome	Knowledge Level
CO1	Understand the basic of Soft Computing Techniques.	K2
CO2	Recognize an appropriate soft computing methodology for an engineering problem.	K3
CO3	Apply fuzzy logic and reasoning to handle uncertainty while solving engineering problems.	K3
CO4	Analysis of neural network and genetic algorithms to combinatorial optimization problems.	K4
CO5	Design of different problems of optimization in power systems	K5

Semester	IV SEM	L	T	P	C	COURSE CODE
Regulation	V21	0	0	32	16	V21PEP03
Name of the Course	DISSERTATION PHASE-II					
Specialization	Power Electronics & Power systems					